

Space radar reveals ancient segments of China's great wall

Scientists in China are using space radar images to locate and study two generations of the Great Wall of China that have been eroded and buried in places by centuries of blowing sand.

"In the images, we can recognize two different dynasties that built the Great Wall. One was built in the Ming Dynasty and is about 600 years old. The other was built during the Sui Dynasty and is more than 1,000 years old," said Guo Huadong, a SIR-C/X-SAR science team member from the Institute of Remote Sensing Applications at the Chinese Academy of Sciences in Beijing.

The radar images were taken by the Spaceborne Imaging Radar C/X-band Synthetic Aperture Radar, or SIR-C/X-SAR, that flew on *Endeavour* in April and October of 1994.

The Great Wall is one of several archeological sites around the world being studied through the use of the space radar images. Other sites include Angkor, Cambodia, the Lost City of Ubar in Oman and the Silk Road along the desert of northwestern China.

"Archeology wasn't one of our original science objectives, but the imaging radar data has been found to be very useful for this type of research. It's an exciting spin-off," said Diane Evans, the SIR-C project scientist at NASA's Jet Propulsion Laboratory.

The Great Wall of China dates back to the Third Century B.C., when it was built to protect the country from northern invaders. The wall, which spans more than 1,860 miles, has been periodically rebuilt and modified throughout history by each reigning dynasty.

The scientists are studying a segment of the wall about 430 miles west of Beijing in a remote region of the north-central China desert. The most recent version of the wall was built by the Ming Dynasty during the 14th century and it is clearly visible both on the ground and in the radar data. An older version, built during the Sui Dynasty, runs parallel to the present wall.

"Part of the wall is visible on the surface, but part of it is buried by the strong winds that blow sand dunes across this part of the desert," Guo said. "In this region the wall was made out of loose soil and mud, not bricks or rocks. Usually you cannot find these segments even if you go there, so the radar data are helping to show us the whole wall."

"Using radar to look at archeological structures has been very powerful because the radar is sensitive to vertical structures, such as walls. Even if they are highly eroded, like these segments of the Great Wall, the radar is able to capture a reflection off it and the wall shows up quite clearly in the radar image," said Jeffrey Plaut, the SIR-C experiment scientist at JPL. "This is a part of the world where we can also take advantage of the radar's ability to penetrate through layers of dry sand to image buried structures. The multiple channels of the SIR-C/X-SAR system increases our ability to detect different kinds of structures that a single-channel radar system would not see."

Radar images of the Great Wall at various resolutions are available over the Internet on the JPL SIR-C/X-SAR home page at the following URL:

<http://www.jpl.nasa.gov/sircxsar/>

Employees honored at launch

Thirty JSC civil service and contractor employees watched the March 22 launch of STS-76 at Kennedy Space Center as recipients of the Space Flight Awareness Award.

The honorees also received a VIP tour of KSC and attended a reception held to recognize their dedication to quality work. Astronaut Tom Jones presented all the honorees with framed certificates and pins.

Civil service honorees were: Greg Aber, Wayne Jermstad, Roger Schwarz and Danny Siner of the Engineering Directorate; Mirella Barron of Flight Crew Operations Directorate; Barbara Conte, Lynda Gavin, Jeff Hanley, Mi-Mi Lau and John Stumpf of the Mission Operations Directorate; Stella James of the Safety Reliability and Quality Assurance Directorate; Jennifer Mason-Korecki and Sharon Thomas of the Space Station Program Office; Cindy Neal of the Office of the Comptroller; and Diana Norman of the Space and Life Sciences Directorate.

Contractor honorees were: Jim Martin, Nigel Packham, Nate Pemberton and Jim Warnix of Lockheed Martin Engineering and Science Services; Mario Cage and Judy Hardin of Loral Space Information Systems; Michael Adkins of Brown and Root Services; Marilyn Brooks of Boeing Aerospace Operations; Tom Johnson of Hughes Training; Frances Jones of Johnson Engineering; Joe Kramer of Hamilton Standard Management Services; Ken Lambert of Allied Signal Technical Services-WSTF; Steve Murphy of Centennial Contractors Enterprises; Brenda Rouse of Kelsey-Seybold Clinic; and David Wyckoff of DynCorp Johnson Support Division.

Correction

The April 19 issue of the Space News Roundup incorrectly identified Stacey Morrison in the photo on page 4 as a Legal Office employee. Morrison works in the Office of the Chief Information Officer.

Commission to promote space

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During its visit to JSC, the Texas Aerospace Commission received detailed briefings on the status of the JSC Human Resources, budget, space shuttle and space station programs, and technology spin-offs. They also toured and received "hands-on" demonstrations of JSC's work in virtual reality and robotics, telemedicine, and the bioreactor, along with walk-throughs of both Mission Control Centers and the shuttle and station mock-ups.

All commissioners commented on the overwhelming sense of pride and accomplishment they felt about the U.S. space program after concluding their day at JSC.

The primary focus of the commissioners is the promotion of economic development initiatives with the



JSC Photo by Benny Benavides

WOMEN IN FLIGHT—Women's Air Force Service Pilot, or WASP, Mildred "Hut" Ferree, left, talks with Yvonne Cagle a JSC flight surgeon during the Women's History Month observance held last month at the Gilruth Center. Both pilots were featured speakers during the program that highlighted the evolution and diversity of female pilots over the past 50 years.

Hatch act briefings set for Monday

The Legal Office will host briefings on April 29 to explain changes in the law regarding employee participation in political activities.

Briefings that focus on the 1993 Reform Amendments to the Hatch Act will be held from 11 a.m.-noon and 1-2 p.m. Monday in the Bldg. 30 auditorium.

On Oct. 6, 1993, President Clinton signed the Hatch Act Reform Amendments of 1993. The amendments became effective on Feb. 3,

1994, and the Office of Personnel Management subsequently published regulations in September 1994. The amendments relaxed prior restrictions on most JSC employees regarding active participation in partisan political activities.

In addition, employees who have not fulfilled their ethics training requirement for this year may do so by attending this briefing. For more information call the Legal Office at x31004.

Security workshops available

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include security engineering, law and policy, risk management, security concepts and technology. Featured speakers will focus on topics such as firewalls, computer incident investigations, Unix and Windows security, intrusion detection and anti-virus technology.

In addition to the conference, eight workshops will be conducted on May 13, covering Investigative Techniques, Secure Internet Commerce, Windows NT Security, Client-Server

Security, Unix Security, Firewalls, Corporate Information Protection and Disaster Recovery.

Vendors will be on hand to display the latest information on security tools and processes. More than 90 public, private and educational institutions will participate in the three-day conference.

JSC civil service employees may attend the conference by submitting a JSC Form 75 to Glen Van Zandt at Mail Code AH3. For more information call Van Zandt at x35266.

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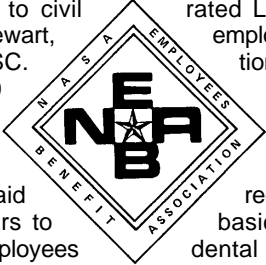
NEBA rep on hand to answer questions

During the month of April the NASA Employees Benefit Association representative, Carl Arnold, will be available to JSC employees to answer questions about existing and new policies.

Arnold will set up shop every Wednesday morning throughout the month of April in Bldg. 45 Rm. 140 to sign up new employees and answer questions from existing policy holders.

"NEBA is a not-for-profit organization that is self funded and provides low cost life insurance to civil servants," said Mike Stewart, chapter president at JSC.

"NEBA has over 1,200 JSC employees currently enrolled and in the last three years alone, NEBA has paid almost 1.6 million dollars to beneficiaries of JSC employees and provided rebates of premiums amounting to more than \$79,000."



Stewart noted that NEBA offers most of the same benefits as the Federal Employees Group Life Insurance plus employees receive more insurance coverage for less money during years they are normally raising a family. Employees also receive free coverage for dependent children from the ages of 14 days to 19 years and the better the NEBA plan performs—the lower rates become.

Stewart added that rates are set by NASA employees based upon industry standards using the NASA workforce claims experience rather than the governmentwide workforce profile. In the fall of 1995, most NEBA rates were reduced based upon the excellent overall plan experience and employees

have received periodic premium rebates based upon plan performance. Twice in the past four years, rebates ranging from \$8 to \$170 have been given to each NEBA enrollee.

"Payments are made easily and automatically through biweekly payroll deduction," Stewart said. "Based upon salary, employees may obtain up to five times the life insurance coverage for a spouse than is available under FEGLI and at less cost."

In addition, under the Accelerated Life Insurance provision, employees may receive a portion of benefits while guaranteeing that the majority of benefits will be paid to beneficiaries and like FEGLI, employees receive twice the amount of basic coverage with Accidental Death and Dismemberment, Stewart said.

If qualified, employees may receive non-smoker rates under the Optional Life Insurance plan and inexpensive travel insurance is available though payroll deduction. Stewart noted that like FEGLI, NEBA basic life insurance covers flight crews participating in shuttle and aircraft missions and employees have guaranteed conversion privileges upon separation from NASA. Dependent children enjoy a guaranteed insurability option at age 19—offering up to \$25,000 in coverage regardless of their health or occupation he added.

Employees may sign up for NEBA insurance at any time and those who seek more information may visit Arnold on Wednesdays in Bldg. 45 or call Employee Services at x33087.

Mir crew talks training

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time work throughout the flight. The dosimeter is moved throughout the station to gather radiation data at various locations.

The crew reported that it has fixed the body mass measuring device, or BMMD, used to calculate the crew members body mass throughout the flight. The unit broke earlier in the mission and is now operating fine. Other biomedical experiments, including blood work is considered an almost daily task for the crew.

The Mir-22 and Mir-24 crew members talked to their colleagues currently on the station about their recent training activities at JSC and future trips to Mir.

Cosmonauts Gennady Manakov, Pavel Vinogradov and French Astronaut Claudie Andre-Deshays—the next crew to launch to the station in July—visited with the Mir-21 crew on a two-way video link as part of the Cosmonautics Day celebration. Mir-24 crew members Valery Korzun and Alexander Kaleri, talked to the current Mir crew last Thursday. The Mir-23 and Mir-25 crews remain in the U.S., undergoing training on space shuttle systems.

At the Gagarin Cosmonaut Training Center in Star City, NASA astronauts continue to prepare for future

stays aboard Mir, training along with cosmonauts colleagues. The next astronaut to stay on Mir, John Blaha, returned from the U.S. April 14 following completion of his last science training session at JSC. This week he continued training on Mir systems and trained on medical countermeasures procedures he will utilize on orbit. Blaha will launch aboard *Atlantis* and replace Lucid in August.

Jerry Linenger and Mike Foale, who will follow Blaha, were in the U.S. for training and returned to Star City last weekend. Astronaut Jim Voss remains in Russia undergoing language training and familiarization training at Star City.

Wendy Lawrence, NASA director of operations in Russia, has completed her second week after having taken over for Charlie Precourt, who recently returned to the U.S. to begin training as commander of the sixth mission of *Atlantis* to dock with Mir—STS-84. In addition to overseeing astronaut training activities at Star City, she also is taking Russian language classes several times a week.

Today is Onufrienko and Usachev's 63rd day aboard Mir since being launched Feb. 21. Lucid joined the crew during *Atlantis*' STS-76 mission and has been a member of the Mir-21 crew for 35 days.